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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.             | CONFIRMATION NO. |
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| 10/571,998   | 03/09/2006  | Hiroo Muramoto       | 20241/0207047-US0               | 1278             |
| 7278   | 7590        | 04/29/2008           |                                 |                  |
| DARBY & DARBY P.C.<br>P.O. BOX 770<br>Church Street Station<br>New York, NY 10008-0770 |             |                      | EXAMINER<br>BERNSHTEYN, MICHAEL |                  |
|  |             |                      | ART UNIT                        | PAPER NUMBER     |
|  |             |                      | 1796                            |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/571,998

**Applicant(s)**

MURAMOTO ET AL.

**Examiner**

MICHAEL M. BERNSTEIN

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 9, 10, 25, 26, 33, 34, 51, 53, 56, 74, 77, 96 and 97 is/are pending in the application.
- 4a) Of the above claim(s) 51, 53 and 74-76 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 9, 10, 25, 26, 33, 34, 56, 77, 96 and 97 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) See Continuation Sheet are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 March 2006 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 03/09/2008
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

Continuation of Disposition of Claims: Claims subject to restriction and/or election requirement are 1,9,10,25,26,33,34,51,53,56,74-77,96 and 97.

### **DETAILED ACTION**

1. This Office Action follows a response filed on February 26, 2008.
2. Claims 51, 53 and 74-76 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on February 26, 2008.
3. Applicant's election with traverse of Group I, claims 1, 9, 10, 25, 26, 33, 34, 56, 77, 96 and 97 in the reply filed on February 26, 2008 is acknowledged. The traversal is on the ground(s) that a search and examination of all the pending claims can be made without an undue burden to the Examiner (page 3). This is not found persuasive because as it was already mentioned in the previous Office action dated February 5, 2008, there are three groups of the inventions. The special technical feature of Group I is the molecular structure (I) in claim 1. The special technical feature of Group II is a polymer setup comprising three different polymer segments put together in the same order of P3, P2, P1, P2, and P3. The special technical feature of Group III is a network type microphase-separated structure for an ion-conductive membrane. Groups I, II and III each have different special technical features and therefore Groups I, II and III lack unity with each other. Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the reasons, which were disclosed in the previous Office action.

The requirement is still deemed proper and is therefore made FINAL.

4. Claims 1, 9, 10, 25, 26, 33, 34, 56, 77, 96 and 97 are active.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 9, 10, 25, 26, 33, 34, 96 and 97 are rejected under 35 U.S.C. §102(b) as being anticipated by Miwa (JP 2002-260441 and JP 2003-045226).

With regard to the limitations of claims 1, 9, 10, 25, 26, 33, 34, 96 and 97, Miwa discloses that a polymeric solid electrolyte contains a polymeric compound composed of a ring-opening polymer of an acrylate backbone-having oxetane compound of general formula (1), wherein a is 10-400, m1 is each independently 1-6, n1 is each independently  $1 \leq n1 \leq 20$ , and  $R_1, R_2$  is each independently an alkyl group which may be branched containing 1-12 carbon atoms or hydrogen atom, and electrolytic salt (abstract).

It is well known that an oxetane group ( $=COCH_2C=$ ) is one kind of epoxy group, which is a possible substituent in the formulas of the claimed invention (see, for example, Richard J. Lewis "Hawsley's Condensed Chemical Dictionary", 14<sup>th</sup> Edition, John Wiley & Sons, 2002, p. 825).

6. Claims 1, 9, 10, 25, 26, 33, 34, 96 and 97 are rejected under 35 U.S.C. §102(b) as being anticipated by Miwa (JP 2003-045226).

With regard to the limitations of claims 1, 9, 10, 25, 26, 33, 34, 96 and 97, Miwa discloses that a polymeric solid electrolyte contains a polymeric compound composed of a ring-opening polymer of oxetane compound having an acrylate skeleton as expressed by formula (1) (wherein a and b are each independently 10-600, m1 and m2 are each independently 1-6, n1 and n2 are each independently  $1 \leq n1 \leq 20$ ,  $1 \leq n2 \leq 20$ , and R<sub>1</sub> and R<sub>2</sub> expresses an alkyl group having containing 1-12 carbon atoms that may be branched each individually, or hydrogen atom. R<sub>3</sub> and R<sub>4</sub> are an alkyl group having containing 1-12 carbon atoms that may be branched each individually), a nonaqueous solvent, and an electrolytic salt (abstract).

It is well known that an oxetane group ( $=\text{COCH}_2\text{C}=\text{}$ ) is one kind of epoxy group, which is a possible substituent in the formulas of the claimed invention (see, for example, Richard J. Lewis "Hawsley's Condensed Chemical Dictionary", 14<sup>th</sup> Edition, John Wiley & Sons, 2002, p. 825).

7. Claims 1, 9, 10, 25, 26, 33, 34, 96 and 97 are rejected under 35 U.S.C. §102(b) as being anticipated by Khan et al. ("ABA triblock comb copolymers with oligo(oxyethylene)side chains as matrix for ion transport", Makromol. Chem., 190, 1069-1078 (1988)).

With regard to the limitations of claims 1, 9, 10, 25, 26, 33, 34, 96 and 97, Khan discloses ABA triblock copolymer consisting of two terminal blocks (A) of comb-like polymethacrylate with oligo(oxyethylene) side chains (on average eight oxyethylene units per side chain) and a middle block B of polystyrene, which were synthesized by anionic polymerization. The ratios A/B were varied. The polymers were then solution-

cast from tetrahydrofuran solutions of lithium perchlorate, and the homogeneous, solvent-free polymer electrolyte systems tested for their thermal characteristics (DSC) and conductivity. The inclusion of a polystyrene block in the comb-like polymethacrylate electrolyte vastly improves their film-forming and mechanical properties, but also lowers the conductivity. Addition of dimethyloctaethyleneglycol (2,5,8,11,14-pentaioxapentadecane) enhances the ion conduction, which can reach values of  $10^{-4} \Omega^{-1} \cdot \text{cm}^{-1}$  at  $70^{\circ}\text{C}$ , depending on salt and styrene content (abstract).

8. Claims 56 and 77 are rejected under 35 U.S.C. §103(a) as being unpatentable as obvious over Khan et al. al. ("ABA triblock comb copolymers with oligo(oxyethylene)side chains as matrix for ion transport", *Makromol. Chem.*, 190, 1069-1078 (1988)) in view of Giles et al. (U. S. Patent 5,196,484).

The disclosure of Khan's reference resided in § 7 is incorporated herein by reference.

With regard to the limitations of claims 56 and 77, the only difference between Khan's triblock comb copolymer and the claimed composition is the sequence of a block chains: B11, A11 and C11, and B1, C1, A, C2 and B2; in the claimed composition the block chain A is in the middle while in Khan's copolymers it is located in the ends.

Giles et al discloses ABA triblock polymers, the A block being rigid having a transition away from its rigid phase above  $70^{\circ}\text{C}$ , the B block being wholly or partly ion-coordinating, elastomeric or amorphous, the B/A block length ratio being greater than 1. When the B block is complexed with an ionic salt these polymers act as polymeric electrolytes, which may be used in cells etc. Preferred polymers are those where

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HC=CH sites in the polybutadiene segment of a polystyrene-polybutadiene-polystyrene polymer are replaced by  $-\text{CH}_2\text{CH}-\text{X}-(\text{CH}_2\text{CH}_2\text{O})_m-\text{R}$ , where X is link, R is alkyl. A preferred salt is  $\text{LiCF}_3\text{SO}_3$  (abstract).

Giles discloses that the B-blocks are ion-coordinating, and the atom in the B-block responsible for ion-coordination is oxygen in an oxyalkane sequence containing 2 to 6 carbon atoms between neighboring oxygen atoms. Preferably, the oxyalkane sequence is a polyoxyethylene sequence, i.e.:  $-(\text{CH}_2-\text{CH}_2\text{O})_m-$  where m is an integer. The ion-coordinating B-block is elastomeric or amorphous. It is therefore desirable to have only short oxyalkane sequences so as to reduce the amount of ambient temperature crystallization. Alternatively, when m is rather high, B-block plasticizers may be mixed with or blended with the polymer, for example low mass (less than ca 800) polyethylene glycol dimethyl ether. Preferably, the value of m should lie in the range 2-22, for example 7-17, which is within the claimed range (col. 4, line 66 through col. 5, line 15).

Both references are analogous art because they are from the same field of endeavor concerning new triblock copolymers for solid polymer electrolytes.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate polymethacrylate with oligo(oxyethylene) block in the middle as taught by Giles in Khan's triblock comb copolymers in order to reduce the amount of ambient temperature crystallization (US'484, col. 5, lines 9-10), and thus to arrive at the subject matter of instant claims 56 and 77.

9. It is worth to mention that the courts have held, as found *In re Wilder*, 563 F.2d 457, 461, 195 USPQ 426, 430 (CCPA 1977), that the compounds which "are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties" ("When chemical compounds have very close' structural similarities and similar utilities, without more a *prima facie* case may be made."). See MPEP 2144.08.

Furthermore, the instant claim 1 contains open transition phrase "comprising" which is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., *Mars Inc. v. H.J. Heinz Co.*, 377 F.3d 1369, 1376, 71 USPQ2d 1837, 1843 (Fed. Cir. 2004) ("like the term comprising,' the terms containing' and mixture' are open-ended.")

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL M. BERNSHTEYN whose telephone number is (571)272-2411. The examiner can normally be reached on M-Th 8-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael M. Bernshteyn/  
Examiner, Art Unit 1796

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